May 19, 1931. W. E. REES 1,806,217

RIVET SETTING AND PUNCHING PRESS

Filed Oct. 16, 1928

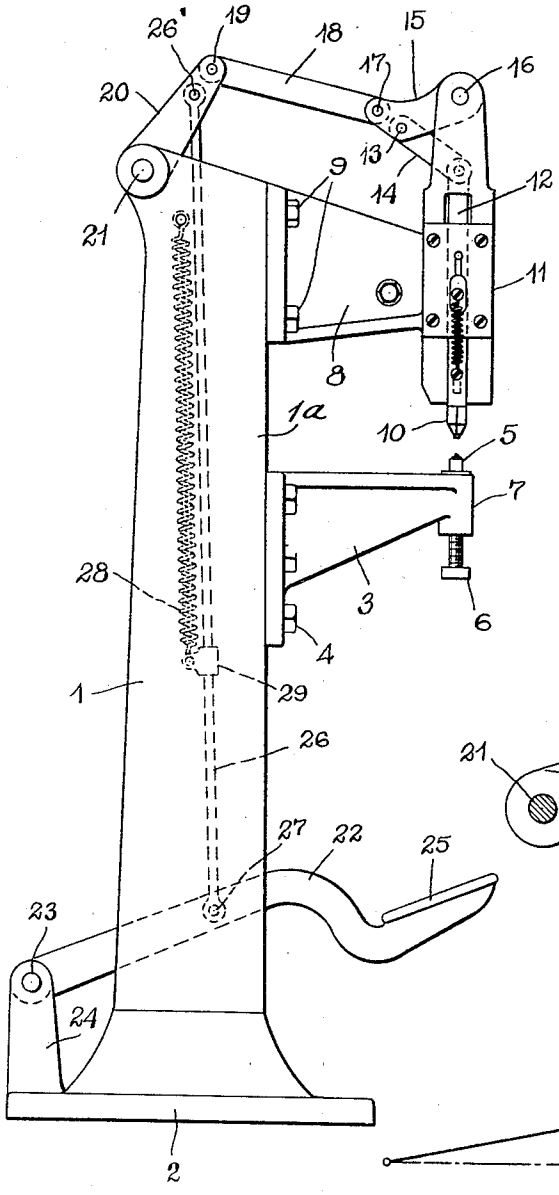
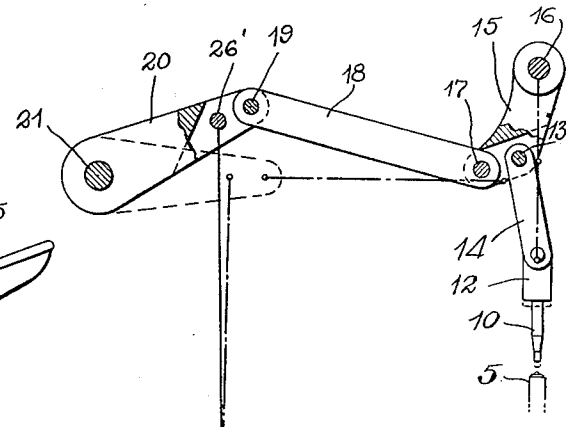


Fig. 1,

Fig. 2,



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RIVET SETTING AND PUNCHING PRESS

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This invention is an improvement in rivet setting and punching presses, and more particularly in mechanism for connecting the operating means, as for instance, a pedal, to the punch, and in the construction whereby different sizes of frame arms can be used in connection with the press.

In the usual construction of press of this type, the connection between the pedal and the plunger is substantially direct, the ratio being approximately one at the pedal to five at the work. The operation is tiring, and considerable noise and jar results. Because of the nature of the connection, a movement of the pedal is required very much greater than the movement of the punch.

One of the primary objects of the present invention is the provision of a construction wherein the movement of the pedal to operate the punch is greatly lessened in extent, and wherein the power available at the punch from the movement of the pedal is greatly increased.

Another object is the provision of a construction wherein the power is gradually increased from the beginning of the stroke to the end, and wherein the maximum power of the stroke is obtained near the end thereof.

Another object is to provide a construction of light weight, requiring a minimum of room, and operating with little noise and jar.

With these and other objects in view the invention consists in the construction and novel combination of parts fully described hereinafter, illustrated in the accompanying drawings, and pointed out in the claim appended hereto, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claim, may be resorted to without departing from the spirit of the invention.

In the drawings forming a part hereof:—

Fig. 1 is a side elevation of the improved press.

Fig. 2 is a detail with parts in section of the connection between the punch and the pedal.

In the present embodiment of the invention, a trunk 1 is provided, usually of cast iron, and having a threaded connection with a base 2, which forms the foundation of the machine. The trunk has one face formed to provide a plane slide-way 1*a*, extending from the top to the base, or sufficiently far for the required adjustments of the arms to be described. A lower arm 3 is secured to the trunk at a suitable height, by means of machine screws 4, and this arm carries the anvil 5, with its adjusting screw 6, a vertical bearing sleeve 7 being provided at the free end of the arm for supporting the anvil and the screw.

The upper arm 8 is secured to the trunk by means of machine screws 9, and it carries the punch 10 and the housing 11 for supporting the punch, the housing being integral with the arm. The arm also carries the driving plunger 12, the rivet pocket plunger, and the automatic rivet feeding apparatus, as are usual in such machines, but which are omitted from the drawings for the sake of clearness. Each of the arms 3 and 8 is made in different lengths, and the lengths of each arm are interchangeable, so that any desired length or size of arm may be used.

The lower arm is adjustable on the trunk, so that the improved press is adapted for every character of work. It will be understood that the different lengths of the arm 3 correspond to the different lengths or sizes of the arms 8, so that they may be paired therewith. Both the lower and the upper arms are usually of cast iron, and a double toggle mechanism is provided for operating the punch or plunger.

One of the toggles is arranged between the housing 11 and the plunger, and the other is arranged between the said toggle and the trunk, being connected to the pedal to be later described. The first toggle includes a link 14 connected at one end to the plunger, and at the other to a link 15 forming the other member of the toggle, and intermediate the ends of the said link. The link 15 is pivoted to the housing 11 at 16, and the pivotal connection of the links is shown at

13. The second toggle is constituted by members 18 and 20. The member 18 which is a link, is pivoted at 17 to that end of the link 15 remote from the connection 16. The member 20 is in the form of an arm pivoted at 21 to the trunk, and at 19 to that end of the link 18 remote from the pivotal connection 17.

The pedal 22 is pivoted at one end at 23, to a bracket 24 extending upwardly from the base 2, and the other end of the pedal is provided with a foot plate 25. A rod or link 26 connects the pedal intermediate its ends, with the arm 20 intermediate its ends, but nearer to the pivotal connection 19 than the connection 20. The connection of the link with the arm 20 is indicated at 26′, and with the pedal 22 at 27. A spring 28 is arranged between the rod and the trunk, and acts normally to move the pedal upward.

As shown, the spring is connected with a sleeve 29 fixed on the link, and it normally holds the parts in the position of Fig. 1. It will be apparent from the description that the connection between the pedal and the plunger includes a double toggle, one constituted by the elements 14 and 15, and the other by the elements 18 and 20, and that the second toggle is so connected with the first toggle, as to act to straighten the first toggle when the second toggle is straightened by the pedal. Thus a maximum of power is attained near the end of the stroke, where power is needed. The first part of the movement of the pedal moves the plunger relatively quick, and with relatively small power. The last part of the pedal movement moves the plunger relatively slow, but with a relatively large increase in power.

In operation, when the pedal is depressed by the foot of the operator upon the foot plate, the arm 26 swings downward as shown in Fig. 2, moving the members of the second toggle toward straight position. At the same time the first toggle is moved toward straight position, and as the respective toggles approach straight position, that is, with the members of the respective toggles more nearly in alinement, the power is greatly increased, and the maximum of power is near the end of the stroke. The more nearly the toggle is straightened, the less movement of the pedal is required to impart a maximum power to the plunger.

The pressure exerted on the pedal has a ratio to the pressure on the work, between the plunger and the anvil, of approximately one to thirty, this pressure being available only for the last one-eighth inch of the downward stroke. The movement of the pedal is also cushioned near the end of the stroke, and jar and noise are substantially eliminated. In the usual construction there is a terrific jar on the leg of the operator from the impact, a frequent cause of varicose veins, and because of this operators usually work only half time. With the present construction, full time can be made by the operator.

In the usual construction of press, a pressure of from 100 to 250 lbs. is required upon the pedal, in order to operate the punch properly, and in presses of the hammer type, pressure as high as 800 lbs. is frequently required to proper setting of the rivet. In the present construction equal results are obtained with a pressure of from 30 to 40 lbs. on the pedal.

What is claimed as new is:—

In a machine of the class described, including a plunger, a pedal for operating the same, a trunk for supporting the plunger and pedal, an arm extending laterally from the top of the trunk, a housing extending above the arm in which the plunger is mounted, a curved lever pivoted at one end to the top of the housing and arranged with its convexity downward, a link connecting the lever to the plunger, an operating lever pivoted to the trunk and to which the pedal is connected, a second link connecting the outer end of the operating lever with the outer end of the curved lever, the pivotal connections of said second link and the curved lever, and the first link connecting the curved lever with the plunger being so arranged that when the curved lever and the second link connecting it with the operating lever are in substantial alinement, the pivotal connection of said second link with the curved lever will be below the pivotal conection of said curved lever and the first link connecting it with the plunger.

Signed at Kingston in the county of Frontenac and State of Onatrio this 8th day of April A. D. 1929.

WILLIAM E. REES.